

### **REMARKS**

Reconsideration of the above-identified application as amended is respectfully requested. Independent claim 1 has been amended as indicated above to more particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Each of independent claims 2 and claim 3 has been amended to correct a misspelling (changing "pentaoxide" to "pentoxide") and to include the chemical formula (P<sub>2</sub>O<sub>5</sub>) in connection with the term "diphosphorus pentoxide".

Claim 1 stands rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. It is the Examiner's opinion that claim 1 as rejected contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Specifically, the Examiner has objected to the term "contaminated" as new matter. Further, the Examiner has objected to the phrase "removing the phosphate-type species from the spent catalyst composition" as new matter. In response, Applicants have amended claim 1 to change the term "contaminated" to "poisoned". Support for this amendment may be found in the specification at paragraph [040], page 14. Additionally, Applicants have amended claim 1 to delete the phrase "removing the phosphate-type species from the spent catalyst composition" and substituting therefor the phrase "washing the water-soluble phosphate-type species that are formed as products upon the catalyst composition." Support for the added language may be found in Applicants' specification at page 14, paragraph [040]. Applicants respectfully submit that claim 1 as currently presented is clearly supported by Applicants' specification, does not constitute new matter, and reasonably conveys to one skilled in the art the subject matter that Applicants regard as their invention. Accordingly, Applicants respectfully request that the Examiner reconsider the rejection of claim 1 under 35 U.S.C. 112, first paragraph, and upon reconsideration withdraw this rejection.

Claim 1 stands under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. More specifically, the Examiner states that "phosphate-type

species" is indefinite as to what the metes and bounds of this language are. Claim 1 has been amended to recite "water-soluble phosphate-type species that are formed as products", not merely "phosphate-type species". Applicants respectfully submit that one of ordinary skill in the relevant art would fully understand the metes and bounds of this language as the term "phosphate" is well accepted in the chemical arts to refer to a compound containing the phosphorus atom and four oxygen atoms in a tetrahedral arrangement ( $\text{PO}_4^{3-}$ ). Claim 1 clearly sets the metes and bounds of the language by referring to washing those phosphate-type species that are water-soluble and formed as products upon the catalyst composition, that is products of the decomposition of the organophosphonate compound. Applicants respectfully submit that claim 1 as amended contains claim language that is definite and thus particularly points out and distinctly claims the subject matter which applicant regards as the invention. Accordingly, Applicants respectfully request that the Examiner reconsider the rejection of claim 1 under 35 U.S.C. 112, second paragraph, and upon reconsideration withdraw this rejection.

Claims 1-3 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Lapidus, U.S. Pat. No. 6,300,268, or Obayashi, U.S. Pat. No. 6,025,292, or Japanese Published Pat. Application No. 10-202106, or Japanese Published Pat. Application No. 58-219942. The Examiner cites each of Lapidus (col. 2,3), Obayashi (its examples), JP '106 (its abstract) and JP '942 (its abstract) as teaching the regeneration of a spent catalyst by washing with water. The Examiner states that the taught spent catalysts appear to be suitable for decomposing voc's or organophosphonate compounds because they are the same metal oxides or activated carbon as cited in Applicants' claims. Applicants respectfully traverse this rejection.

Lapidus teaches a multi-step process for regenerating cobalt-containing catalysts, in particular cobalt supported on titania, deactivated by sulfur including the steps of first treating the spent catalyst with a stream of oxygen, air or oxygen enriched air to oxidize the sulfur, next washing the catalyst with a liquid, preferably water, and thereafter contacting the washed catalyst with hydrogen or other reducing agent (see col. 2, lines 5-22 and col. 3, lines 10-33). Applicants respectfully submit that Lapidus

can not be read to teach regenerating a spent catalyst by simply washing with water, while ignoring the further steps taught by Lapidus of subjecting the spent catalyst to an oxidizing atmosphere prior to washing with water and then subjecting the spent catalyst to a reducing atmosphere post washing with water. The water washing step of Lapidus is merely to remove the oxide or oxides of sulfur formed in the oxidization step prior to exposing the catalysts to the reduction step (see Lapidus, abstract and col. 2, lines 13-18). Without removing those oxides prior to reduction, the reduction step would simply result in reduction of those oxides back to their original form. Applicants respectfully submit that Lapidus lacks any motivation that would lead one looking to regenerate a spent catalyst to omit the oxidization and reduction steps and apply the intermediate step of washing with water to remove oxides as the sole step to regenerate the catalyst. Further, Applicants respectfully submit that one skilled in the art would not be motivated by Lapidus to apply the intermediate step of washing with water to remove oxides prior to a reduction step as the sole step of regenerating a catalyst for decomposing organophosphonates by washing the spent catalyst with water to wash therefrom "water-soluble phosphate-type species form as products upon the catalyst" as recited in claim 1.

Obayashi et al. teaches a method of regeneration of a denitration catalyst (consisting of titania, tungsten trioxide and vanadium pentaoxide) by cleaning the spent catalyst with a solution having a hydrofluoric acid concentration of 0.3 to 3% by weight to remove silica compounds without damaging the structure of the catalyst (see col. 7, lines 33-47). In fact, Obayashi et al. teach away from washing the spent denitration catalyst with water, stating at col. 7, lines 36-38, that the effectiveness of the cleaning fluid "will be insufficient if the hydrofluoric acid concentration of the cleaning fluid is less than 0.3% by weight." Applicants respectfully submit that Obayashi et al. lacks any motivation that would lead one looking to regenerate a spent catalyst for decomposing organophosphonate compounds to modify the cleaning solution disclosed in Obayashi et al. for removing silica compounds from a catalyst by deleting the hydrofluoric acid component of the disclosed cleaning fluid. Further, Applicants respectfully submit that Obayashi et al. lacks any motivation that would lead one skilled in the art to instead wash a spent catalyst for decomposing organophosphonates with water to wash

therefrom "water-soluble phosphate-type species that are formed as products upon the catalyst composition", as recited in claim 1.

The abstract of JP'942 regenerating a deodorizing catalyst consisting of an oxide of a metal such as Mn, Co, V, Cr, Fe, Ni, Cu, Ag or Zn on activated carbon in a multi-step process consisting of first washing the spent catalyst with an aqueous ammonia solution having a pH of 10-11 to remove sulfuric acid or metal sulfate, then washing with water and baking the catalyst at a temperature of 200-300°C in an inert atmosphere. Applicants respectfully submit that the abstract of JP'942 can not be read to teach regenerating a spent catalyst by simply washing with water, while ignoring the further taught steps of subjecting the spent catalyst to treatment with aqueous ammonia prior to washing with water and then baking the spent catalyst. Applicants respectfully submit that JP'942 lacks any motivation that would lead one looking to regenerate a spent catalyst to omit the ammonia treatment and baking steps and apply only the step of washing a spent catalyst for decomposing organophosphonates with water to wash therefrom "water-soluble phosphate-type species that are formed as products upon the catalyst composition", as recited in claim 1.

The abstract of JP'106 regenerating a hydrogenation catalyst consisting of palladium on activated carbon in a multi-step process consisting of first treating the spent catalyst with steam or hot water (40-150°C), then washing with water and cooling the catalyst to a temperature less than 40°C. Applicants respectfully submit that the abstract of JP'106 can not be read to teach regenerating a spent catalyst by simply washing with water, while ignoring the further taught steps of subjecting the spent catalyst to treatment with steam or hot water prior to washing with water and then cooling the spent catalyst. Applicants respectfully submit that JP'106 lacks motivation that would lead one looking to regenerate a spent catalyst to omit the steam/hot water treatment and cooling steps and apply only the step of washing a spent catalyst for decomposing organophosphonates with water to wash therefrom "water-soluble phosphate-type species that are formed as products upon the catalyst composition", as recited in claim 1.

With respect to each of Lapidus, U.S. Pat. No. 6,300,268, or Obayashi, U.S. Pat. No. 6,025,292, or Japanese Published Pat. Application No. 10-202106, or Japanese Published Pat. Application No. 58-219942, the Examiner states that the instant claims do not exclude the "further taught steps". However, Applicants respectfully submit that there is no motivation in any of these references that would lead one skilled in the art to even attempt to try to regenerate a spent catalyst without including all steps of each respective procedure. Further, Applicants respectfully submit that there is simply no recognition or suggestion in any of the cited references that would lead one skilled in the art to apply the prescribed procedures, with or without modification, for regenerating a spent catalyst composition decomposing organophosphonate compounds. Applicants respectfully submit that none of the cited references provides any teaching, suggestion or motivation that would lead one skilled in the art to apply only the step of washing a spent catalyst for decomposing organophosphonates with water to wash therefrom "water-soluble phosphate-type species that are formed as products upon the catalyst composition", as recited in claim 1.

For the reasons represented in the foregoing several paragraphs, Applicants respectfully submit that claims 1-3 are patentable under 35 U.S.C. 103(a) over Lapidus, U.S. Pat. No. 6,300,268, and Obayashi, U.S. Pat. No. 6,025,292, and Japanese Published Pat. Application No. 10-202106, and Japanese Published Pat. Application No. 58-219942. Accordingly, Applicants respectfully request that the Examiner reconsider this rejection of claim 1-3 and upon reconsideration withdraw this rejection.

Claim 1 also stands rejected under 35 U.S.C. 103(a) as being unpatentable over D'Aniello, Jr., U.S. Patent 4,548,911 or McArthur, U.S. Patent 4,039,471. The Examiner cites each of D'Aniello, Jr. and McArthur suggest the claimed process of removing phosphate-type species from a phosphorus poisoned spent catalyst by washing with a water solution, citing col. 1, line 58 to col. 2, line 25 and col. 3, lines 16-27 of D'Aniello, Jr., and col. 1 and the examples of McArthur. The Examiner is of the opinion that the taught catalyst would appear to be suitable for decomposing organophosphate compounds. Applicants respectfully traverse this rejection.

D'Aniello, Jr. relates to the regeneration of poisoned catalyst of an automotive catalytic converter for converting unburned hydrocarbons and carbon monoxide to carbon dioxide and water and to convert nitrogen oxides to nitrogen and water. D'Aniello, Jr. specifically teaches treating the poisoned catalyst with one or more washes with a hot acid solution or by filling the pores of the catalyst with the acid solution to the point of incipient wetness (see col. 1, lines 61-65). Both aqueous mineral acid and aqueous solutions of dibasic organic acid are said to be effective (see col. 2, lines 31-43).

McArthur also relates to reactivation of deactivated automobile emission control catalysts. At col. 1, lines 57-67, McArthur specifically teaches that contaminant poisons of lead and phosphorus can be removed from NOX reduction and CO/hydrocarbon oxidation catalysts by the three-step process of subjecting the catalysts to (1) an optional extraction of some of the poisons with an aqueous solution of one or more select ammonium and/or acetate solutions, (2) reduction in an atmosphere preferably containing H<sub>2</sub> and/or CO, and (3) extraction once again with an aqueous solution of one or more select ammonium and/or acetate salts.

Accordingly, Applicants respectfully submit that neither D'Aniello, Jr. or McArthur can fairly be read to teach or suggest to or motivate one skilled in the relevant art to wash a spent catalyst for decomposing organophosphonate compounds with water to remove therefrom phosphate-type species formed as products of the destruction of the organophosphonates. Both of references relate to regeneration of automotive emission catalysts for converting nitrogen oxides, carbon monoxide and hydrocarbons, not catalysts for the destruction of organophosphonates and there is no teaching in either reference that would lead one skilled in the art to apply the disclosed automotive emission control catalysts to the destruction of organophosphonate compounds. Further, even if one skilled in the art were to look to these references, D'Aniello, Jr. only teaches washing the catalyst with a hot acid solution and McArthur only teaches a three step process for treating the catalyst teaching a reduction step sandwiched between two washing steps wherein the catalyst is washed with an ammonium or acetate solution. Therefore, Applicants respectfully submit that claim 1 is patentable under 35

U.S.C. 103(a) over D'Aniello, Jr. and McArthur. Accordingly, Applicants respectfully request that the Examiner reconsider this rejection of claim 1 and upon reconsideration withdraw this rejection.


In view of the amendments made to the claims and the arguments presented herein, Applicants respectfully request that the Examiner reconsider all rejections of claims 1-3, and upon reconsideration withdraw all rejections and pass the pending application with claims 1-3 to allowance.

If the Examiner wishes to expedite disposition of the above-captioned patent application, he is invited to contact Applicant's representative at the telephone number below.

Applicant believes no fee is due with this response. However, if a fee is due, please charge Deposit Account No. 03-0835, under Order No. 210\_1091DIV RCE from which the undersigned is authorized to draw.

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Respectfully submitted,

By   
William W. Habelt  
Registration No.: 29,162  
MARJAMA MULDOON BLASIAK &  
SULLIVAN LLP  
250 South Clinton Street  
Suite 300  
Syracuse, New York 13202  
(315) 425-9000  
Customer No.: 20874